National Aeronautics and Space Administration

NASA Academy

Glenn Research Center

2005 Profile Book

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Glenn Research Center
Cleveland, Ohio

2005
Profile Book

University Programs Office

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http://grc.nasa.gov/WWW/5000/academy

Michael Griffin
NASA Administrator

The NASA Mission

To understand and protect our home planet,
To explore the universe and search for life,
To inspire the next generation of explorers
… as only NASA can.

Julian Earls
Director, NASA Glenn Research Center

New Horizons

The Glenn Research Center drives the engine of innovation. The Center's expertise continues to be critical to NASA's future missions in air and space. As private and commercial aviation expands, NASA Glenn will propel aircraft to new standards of performance and efficiency. With a new vision for exploring our solar system, NASA Glenn engineers and scientists are ready to pursue breakthrough technologies in advanced power, propulsion and communications to enable human and robotic missions to the Moon and beyond.

(From "The Glenn Research Center Expanding Horizons and Opening Frontiers" NASA Fact Sheet FS–2004–08–009–GRC)

A Brief History of the NASA Academy

The NASA Academy was founded in 1993 at the Goddard Space Flight Center by Gerald (Jerry) Soffen, former Mars Viking project scientist, architect of the NASA Astrobiology program, and first Director of the Goddard Office of University Programs. Jerry was an accomplished scientist and a dedicated educator. He took advantage of the unusual opportunities presented to him during his career and realized the importance of mentoring in the life of young professionals. In his vision, the Academy was intended to exceed in purpose and content all the other regular internships by familiarizing its participants with as many facets of the NASA agency as possible. With his dynamic personality and unique leadership, he opened many gateways and defined a new standard of excellence.

As the reputation of the Goddard Academy widened, new NASA Academy Programs were started at the Marshall Space Flight Center (1994), the Ames Research Center (1997), and the Dryden Flight Research Center (1997). This will be the first year a NASA Academy has taken place at the Glenn Research Center, in addition to concurrent NASA Academies occurring at Goddard and Marshall.

Jerry Soffen died on November 22, 2000. We honor his legacy by continuing the Academy program that he loved so well.

In 2002, the NASA Academy celebrated ten years of successful activity. So far, 428 participants have graduated from the program.

"To give possible 'leaders' a view into how NASA, the university community, and the private sector functions, set their priorities, and contribute to the success of the aerospace program."

Gerald Soffen, Founder
(1926–2000)

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Program Description

The NASA Academy is an intensive resident summer program of higher learning for college undergraduate and graduate students, dedicated to promoting current and future opportunities for aerospace innovation and leadership. It is a unique and prestigious NASA internship program for talented students interested in pursuing professional and leadership careers in space-related fields.

The NASA Academy program is designed to present a comprehensive picture of the organization of the NASA Agency, some of its most important current and planned science, engineering, education, and technology enterprises, as well as a number of non-technical areas of critical significance, such as management, budgeting, safety, personnel and career development, leadership, space law, international cooperation, etc. Besides attending lectures and workshops, students are involved in supervised laboratory research, and will participate in visits to other NASA Centers and facilities, space-related academic laboratories, and industries.

NASA Academy provides immersive and integrated multidisciplinary exposure and training, for students with various backgrounds and career aspirations. The academic curriculum balances opportunities for direct contact with advanced science and engineering R&D and an awareness of the complex managerial, political, financial, social, and human issues faced by the current and future aerospace programs.

Program Objectives

- To identify, to encourage, and to assist the future leaders of the aerospace program
- To provide an opportunity for participants to contribute to research in a world-class, space-related laboratory
- To provide a unique, intensive, and rigorous educational and training curriculum on NASA, its in-house science and technology projects, its collaboration with other National centers, industry, and academia, and its extensive technology-transfer programs
- To foster creativity, personal initiative, and leadership qualities, together with teamwork, appreciation for diversity, and professional ethics
- To facilitate access to, and dissemination of valuable information on career development paths, financial support, technical writing standards, intellectual property, etc.

Eligibility and Selection Criteria

The 5 participants in the 2005 NASA Academy at the Glenn Research Center have been selected from a pool of over 1200 applicants. Selection was based following criteria:

- Academic rank (junior, senior, first, or second year graduate)
- Academic performance (GPA higher than 3.0 or equivalent)
- Demonstrated interest in the space program
- Demonstrated leadership qualities
- Research and/or project interest and experience
- Maturity
- Recommendation and references
- Citizenship or permanent residence is required for US applicants

Both the selection process and placement of the Academy participants were assisted by recommendations from faculty, administrators, academic supervisors, and co-workers, and the applicants' self-profiling essays.

Peter Galie

Princeton University
Princeton, NJ

Mechanical and Aerospace Engineering
Bachelor of Science, June 2006

NASA Academy Research Project
Microcombustion: Catalytic Partial Oxidation of Ethanol in a Heated Nickel Microtube

Principal Investigator
Steve Schneider

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Cherry Hill, NJ 08003

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Education

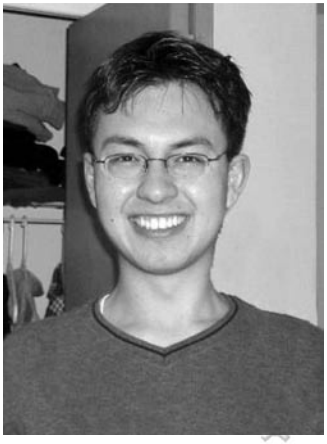
I have just completed my third year at Princeton University this spring. I will graduate next year with a degree in Mechanical and Aerospace Engineering, with two certificates in Robotics & Intelligent Systems and Environmental Studies. My coursework has included the basic requirements including statics, dynamics, both ordinary and partial differential equations, fluid dynamics, and mechanical design. To qualify for my certificate programs I have also taken courses in atmospheric chemistry, cognitive psychology, and other interdisciplinary fields. I plan on my thesis work for senior year to involve microcombustion for propulsion of satellites.

Experience

My previous research experience has been limited, but my work experience is extensive. I have worked for two main contractors for the U.S. Navy, BAE Systems and Lockheed Martin. At Lockheed Martin I participated in the OCDP Program, a prominent leadership development summer program. I was assigned to the manufacturing and production divisions where I oversaw manufacturing processes and assisted supervisors inspect materials for the AEGIS Radar Systems.

Extracurricular Activities

I am very active both during the school terms and over the summers. I have been part of the Division 1 Varsity Cross Country and Track Teams my three years at Princeton. In addition to competing next fall, I also will be the Co-President of the ASME chapter at Princeton and continue my work as Social Chair of the Princeton Paddies, an Irish student group on campus. I have many hobbies including playing guitar, writing poetry, and working on cars. I love the outdoors and during the fall and spring I do plenty of mountain biking and hiking. Over the summer I surf, skimboard, and help my uncle with his boat down at the Jersey shore. My main goals within the next year are to begin taking flight lessons, and to get my motorcycle license.



Christopher Glein

University of Washington
Seattle, Washington

Chemistry
Bachelor of Science, 2006

NASA Academy Research Project
In-Situ Resource Utilization for Surface Power Systems

Principal Investigator
Al Hepp

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Education

I began college without much direction in mind. I desired a college education simply because it was the "right" thing to do. Luckily, I met an amazing professor near the end of my freshman year. He quickly inspired me to search for a deeper understanding of the natural world. I quickly gravitated towards the field of chemistry because it offered the amazing connection between two very different worlds, the large and the small. The coursework that I have taken thus far have stressed both theoretical and experimental approaches. Courses such as Organic, Analytical, Inorganic, and Physical Chemistry have strengthened my basic knowledge. Advanced coursework in Computational and Transition Metals Chemistry have given me the tools necessary to do sophisticated research. Recently, I have acquired an interest in applying chemistry to the Earth Sciences. Basic courses in geology and planetary science have given me a new perspective on global chemical processes.

Experience

Over the past year and a half I have been involved in Astrobiology and Planetary Science research. During the fall and winter of the 2003–2004 academic year, I worked with my mentor, Professor David Catling, examining the role of molecular oxygen in the development of complex animal life on habitable planets. We wrote a paper entitled "Why O_2 is Required by Complex Life on Habitable Planets and the Concept of Planetary 'Oxygenation Time'." This paper will be published in the June 2005 issue of Astrobiology. Lately, I have been focusing on the planet Mars. I have been working with the UW Mars Research group analyzing unusual sedimentary rocks found in chasms on Mars. I am also in the process of developing a lee wave cloud model in an effort to better understand Martian atmospheric dynamics.

Extracurricular Activities

I consider myself a typical college guy. I enjoy playing all sorts of sports whenever I have time. My favorites are baseball, basketball, football, tennis, and bowling. I like the outdoors and enjoy hiking and camping in the mountains whether rain or shine. I also like to go boating, fishing, and crabbing during the warm summer months. Another passion of mine is writing. If I'm struck by an idea I can literally write for hours on end. I am a member of the Alpha Chi Sigma National Chemistry Fraternity and I enjoy hanging out with my fellow fraternity members from time to time. Lastly, I find amateur astronomy to be really fun and I can usually be found gazing at the stars on clear nights, although we don't get many up here in Seattle!

Ayanna Anika Moses

Medgar Evers College, CUNY
Brooklyn, New York

Mathematical Science

Bachelor of Science, June 2005

NASA Academy Research Project
Microstructural Evaluation of Advanced Materials

Principal Investigators
David Hull and Mike Nathal

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Education

My high school years were spent at Central High School, and Bishop's High School in Georgetown, Guyana. At Medgar Evers College (MEC), I began my college education as a business major, because that was the track I took in high school. A semester later I changed to computer science. While fulfilling the associate degree requirements for the computer science degree, I took advanced mathematics courses so as to train myself in a systematic way of thinking. The math drew me, and I switched to a mathematics major. I have an avid interest in differential equations and complex variables because they show the applied side of mathematics. As a result of this applied side, I used my elective credits to explore the other science courses available. These included organic chemistry and university physics as well as space science. My academic experiences as well as my drive for science added to my desire to attain a PhD in Material Science and Engineering.

Experience

I have explored areas in mathematics, programming and chemistry as a research assistant at Medgar Evers and at a couple of NASA centers. My mathematics endeavors included research in sorting algorithms, and the Markov Chain of prediction probabilities. For two summers I performed programming tasks using Java and PERL programming languages at Goddard, and at JHU Applied Physics Laboratory. Also, for the past year I was a member of the Flight team on MECSAT Balloon Launching Mission. Currently, as an aid to Dr. Kwesi Amoa of Medgar Evers, I am synthesizing new cyclin-dependent kinase 2 compounds that may inhibit proliferative diseases such as cancer and psoriasis. At the New York Chemistry Student's Association's 53rd Annual Undergraduate Research Symposium I gave an oral presentation on this research project.

Extracurricular Activities

As an undergraduate, I was a member of the MEC Association for Black Social Worker and the MEC Association for Computing Machinery; both clubs have affiliations with their respective national organizations. I played softball with my fellow Cougars as part of MEC's softball team. Currently, my hobbies are focused around animation, particularly the Japanese animes and mangas. Because of this I am also learning about Japanese language as well as their culture. My other interests include video games, and the science channel provided by my new cable service. I also love movies, particularly action and Hindi movies. For the future I aim to learn Japanese, Hindi, and to play the violin.

Katrina Schweiker

Pennsylvania State University
State College, Pennsylvania

Integrative Biosciences

Graduate Degree Program PhD, August 2008

NASA Academy Research Project
Mechanotransduction Gene Expression Profiles in Osteoblast Cell Cultures

Principal Investigator
Greg Zimmerli

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Education

I got my BS in Physics from the University of Minnesota in 2004, where my emphasis was in biological systems. I was in the Air Force ROTC program, and I received my commission last year as well. I had the opportunity to do lots of cool research projects in fields like space physics, optics, and physiology. I especially liked the last one, which was my Senior Thesis because we were trying to design a system to induce hypothermia non-invasively by suppressing shiver. The hope is that this would prevent the brain damage that often accompanies ischemia suffered by stroke and head trauma patients while simultaneously running diagnostic testing that cannot be done under the current methods to induce hypothermia.

Experience

My current assignment for the Air Force is to get my PhD. I think it is one of the best assignments ever, as it is giving me a ton of experience and opportunities that I wouldn't have had otherwise. Right now I am working in a lab that works on engineering thermostable proteins and uses computational biology to try to devise methodology to predict which mutations will provide greater stability. I also spent much of the last year rotating through labs where I did everything from purify gangliosides (this involved many hours with cow brains) to mass spectrometry.

Extracurricular Activities

I pretty much live by the motto "I'd rather be snowboarding" … I started when I was about 17 and I haven't stopped. Two years ago I got my SCUBA certification, and last year I got to dive in Hawaii. I also started mountain biking a year ago and it was great fun. In the summer, I spend as much time as possible at the pool, hiking, rollerblading, or doing anything that involves being outside. I also love to move, and I tend to move at least once every 2 years, though I think my family wishes I would settle down. When I can get at least a week off work at a time, I like to travel. I spent the summer of 2003 in Italy and it was amazing.

Jordan Wirfs-Brock

Massachusetts Institute of Technology
Boston, Massachusetts

Aeronautics and Astronautics
Minor: Literature
Bachelor of Science, 2006

NASA Academy Research Project
Mitigation of Dust and Electrostatic Accumulation for Human and Robotic Systems for Lunar and Martian Missions

Principal Investigator
Juan H. Agui

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Education

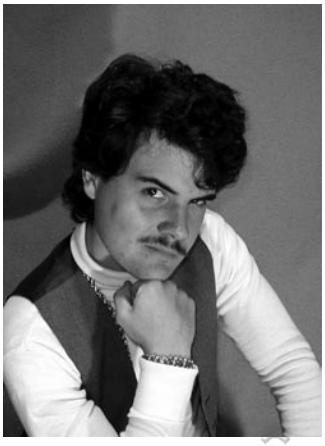
I am days away from finishing my junior year in the Aerospace Engineering department at MIT. Within my major I have a focus on communications and controls; I have also taken classes in thermal energy, dynamics, materials and structures, signals and systems, fluids, and computer programming. During college I have studied Linguistics and Geology, and completed several semesters of Russian, but ultimately decided to minor in Literature.

Experience

During the past year I joined the Man Vehicle Lab at MIT and have been working on the BioSuit project, an initiative to create an innovative extra-vehicular spacesuit. We have been working on the problem of using mechanical counter-pressure to provide the skin with the surface pressure it needs to function. I have helped to create prototype spacesuit components and test them in our lab's low pressure vacuum chamber. Last summer I worked in MIT's Geochronology lab studying eclogite facies rocks from Greenland. Eclogites are rare metamorphic rocks whose origins could possibly reveal how crustal plates first formed on the Earth. I processed rock samples in order to extract zircon grains for dating and observation. During high school I spent three years remotely studying Venusian geology using Magellan Satellite radar data with a classmate. We completed projects on shield volcanoes, pancake domes, and tessera.

Extracurricular Activities

I am a member of MIT's varsity women's basketball, cross country, and outdoor track teams. Last October I flew to my hometown, Portland, Oregon, to run my first marathon. I also ran the Boston Marathon in April. I am a member of MIT's campus radio station (not only because I get lots of free tickets to local concerts), where I dj for the country's oldest daily punk show, the Late Risers Club. I love hiking and backpacking, and would gladly choose a week in the wilderness over just about any other activity. I love to read and almost never leave home without a book. My record for consuming a half-gallon of ice cream is 15 minutes 29 seconds.



Marshal Blessing

Alumni Staff Member
University of Central Florida
Orlando, FL

Computer Engineering

Bachelor of Science, April 2004

Attended NASA Ames Astrobiology Academy 2004
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Education

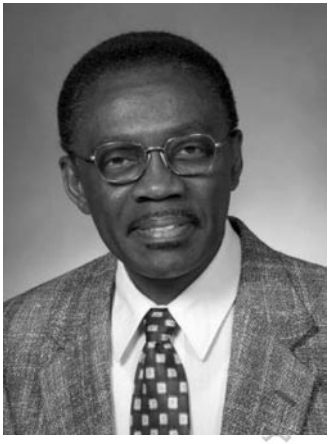
I graduated from the University of Central Florida in April 2004, where I majored in Computer Engineering. For my senior design project, I worked with engineers from NASA and the Florida Space Institute on designing the control system for a satellite to test a Microwave Electro-Thermal Thruster. However, such academic endeavors kept me very busy. Perhaps that is why I have also developed a fascination with modern physics and time travel. I find I can always make time for studying such topics.

Experience

I had a fantastic experience in the NASA Ames Academy last summer, learning and making friends. I performed research on real-time, physically accurate computer simulations of Mars rovers, under the guidance of PI Dr. Jeffery Smith. One of my main scientific interests is robotics. I performed undergraduate research in the Mechatronics Laboratory at Clemson University two years ago. My work involved biologically inspired robotics, specifically manipulators mimicking trunks and tentacles. I found the subject gripping, and it led to a research paper that I presented in Sydney, Australia last summer. Since then I have traveled to Vancouver, Canada for the Space Generation Congress and MIT where I presented posters at the SEDS National Conference. Recently I also earned my private pilot license. I am hoping it will facilitate future travels.

Extracurricular Activities

In my spare time, I like relaxing with friends and watching horror films. Unfortunately, not all of my hobbies can be as intellectually stimulating. I am a fan of board games, especially chess. I am also an art enthusiast, and enjoy photography and drawing. Athletically, my interests do not extend beyond billiards. I plan on eventually earning an advanced degree in either computer technology or in physics, but first I want to gain some experience in the aerospace industry. I look forward to the challenge of starting a NASA Academy at the Glenn Research Center. It cannot be any more difficult than space travel, something else I aspire to experience in the future.



Dr. M. David Kankam

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Dr. Kankam joined the NASA Glenn Research Center (GRC) in March 1990, as a Senior Research Engineer in the Power and On-Board Propulsion Technology Division. He currently serves as the University Affairs Officer in University Programs Office in GRC's Research and Technology Directorate, with oversight responsibility for GRC research community collaboration with academia, in support of the Center research programs.

Dr. Kankam earned his Diploma in Business Administration (Management Studies), and PhD, MASc and BASc (Applied Science and Engineering) degrees in Electrical Engineering from the University of Toronto, Canada. He is a Registered Professional Engineer in Ontario, Canada, a member of the Canadian Society of Professional Engineers, a Senior Member of the IEEE, and its Industry Application Society (IAS). He is the current chairman of the Industrial Automation and Control Committee of the IEEE/IAS.

Dr. Kankam was a Research Officer in the R/D Division-Ontario Ministry of Transportation and Communications (MTC), Toronto, Canada, from December 1973 to August 1977. He was then employed as an Engineer at Ontario Hydro, Toronto, Canada, from September 1977 to February 1979. He was an Application Engineer at General Electric Company in Schenectady, NY, from March 1979 to March 1990.

He served on the GRC's Fellowship Selection Committee for several years, Technical Review Teams, Panel of Evaluators for NASA Research and Internship Programs, and as GRC's Technical Representative of NASA 'Faculty Awards for Research' Program from 1992 to 1997. He has proctored and mentored summer Faculty Fellows and Student Interns, respectively, to complement in-house research programs. He was selected as a NASA Administrator Fellow from 1997 to 1999. During the 1997–1998 academic year he was a Visiting Professor in the Department of Electrical Engineering, Howard University, Washington, DC, where he taught "Energy Conversion", and co-developed the "Automation and Control Laboratory." Subsequently, he was a Visiting Research Engineer at the Royal Military College of Science in Shrivenham, England.

He was appointed Acting Chief of the Electro-Mechanical Systems Branch, from November 2000 to March 2001. Subsequently, he served as a Strategic Planning Manager in the Aeropropulsion Research Program Office, in support of Aerospace Propulsion and Power Programs. As a former senior research engineer, he planned and performed research, and managed, identified and consulted on the development of power and power electronics-based systems for aerospace and terrestrial applications. He has authored/co-authored over fifty technical reports, and more than sixty refereed publications on the dynamics and control of power and electronics-based systems.

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